

CLAIMS

What is claimed is:

1. A device for inrush current prevention and dynamic braking in a motor having a plurality of power inputting terminals, comprising:
 - a diode rectifying unit rectifying power supplied from an AC power supplying unit;
 - a capacitor smoothing the power rectified by the diode rectifying unit;
 - a resistor disposed between the AC power supplying unit and the capacitor, being connected to the capacitor;
 - an inverter, connected to first and second terminals of the capacitor and the power inputting terminals of the motor, inverting the smoothed power from the capacitor into an AC power having multiple phases and supplying the AC power having the multiple phases to the motor;
 - a dynamic braking circuit short-circuiting the power input terminals of the motor; and
 - a relaying unit including a first node to connect the dynamic braking circuit to the resistor and a second node connecting the rectifying unit to the capacitor in parallel.
2. The device according to claim 1, wherein the dynamic braking circuit comprises:
 - pairs of dynamic braking diodes connected, in parallel, and each power inputting terminal of the motor is connected to a respective common node between one diode and a remaining diode of each pair of the dynamic braking diodes, and the pairs of dynamic braking diodes connected, in parallel, are connected to each other in a forward direction.
3. The device according to claim 2, wherein:
 - the inverter comprises:
 - a plurality of inverting circuits, respectively, connected, in parallel, to the capacitor, and
 - each of the inverting circuits has a pair of inverting elements comprising:
 - a transistor; and
 - a diode connected to the transistor, in parallel; and
 - each of the power inputting terminals of the motor is connected between the inverting

elements of each of the inverting circuits.

4. The device according to claim 3, wherein at least one of the pair of dynamic braking diodes connected to each power inputting terminal of the motor in forward and reverse directions is replaced with a diode of the inverting element connected to the resistor, among the pair of inverting elements of each inverting circuit.

5. The device according to claim 4, wherein the relaying unit is connected to the first node when power is initially applied, allowing the power rectified by the diode rectifying unit to be transmitted to the capacitor through the resistor.

6. A device for inrush current prevention and dynamic braking in a motor having inputting terminals corresponding to each of the phases of the motor and supplied by an AC power supply, comprising:

- a rectifying unit to rectifying power supplied from the AC power supply;
- a capacitor smoothing the rectified AC power from the rectifying unit;
- a resistor disposed between the AC power supply and the capacitor;
- an inverter connected to first and second terminals of the capacitor and the inputting terminals of the motor to invert the smoothed power from the capacitor into power having multiple phases to supply the multiple phased power to the motor;
- a dynamic braking circuit short-circuiting the power input terminals of the motor; and
- a relaying unit including a first node connecting the dynamic braking circuit to the resistor and a second node connecting the rectifying unit to the capacitor in parallel.

7. A device for inrush current prevention and dynamic braking in a motor having inputting terminals corresponding to each of the phases of the motor and supplied by a rectified power supply, comprising:

- a series of a resistor and capacitor in parallel with the rectified power supply;
- an inverter having an input connected in parallel with the capacitor and plural outputs corresponding to and connected to the inputting terminals of the motor;
- a dynamic braking circuit including a first set of nodes which are connected to respective

ones of the inputting terminals of the motor and at least a second node which is connectable to the rectified power supply; and

a relay to connectably switch one of the dynamic braking circuit to one end of the resistor, and the rectified power supply to the capacitor in parallel.

8. The device according to claim 7, wherein the dynamic braking circuit further comprises:

a further node connecting the dynamic braking circuit to a second end of the resistor such that the dynamic braking circuit is switchable to be in parallel with the resistor to slow down or to stop the motor.

9. The device according to claim 8, wherein the dynamic braking circuit comprises: plural sets of dynamic braking diodes connected, in parallel, the plural sets of the dynamic braking diodes connected to respective inputting terminals of the motor by the first set of nodes, and each of the plural sets of the dynamic braking diodes connected in parallel is connected to each other in a forward direction.

10. The device according to claim 7, wherein the dynamic braking circuit comprises: dynamic braking diodes, respectively, to connect one end thereof to each other and a remaining end thereof to a respective one of the inputting terminals of the motor, the dynamic braking diodes are connected to each other in a forward direction.

11. The device according to claim 7, wherein: the inverter comprises:

a plurality of inverting circuits, respectively, connected, in parallel, to the capacitor, and

each of the inverting circuits has a pair of inverting elements comprising:

a transistor; and

a diode connected to the transistor, in parallel; and

each of the inputting terminals of the motor is connected between the inverting elements of a respective one of the inverting circuits.

12. The device according to claim 7, wherein the relay connects the dynamic braking circuit to one end of the resistor when the power is initially applied, allowing a rectified power from the rectified power supply to be transmitted to the capacitor through the resistor.

13. The device according to claim 7, wherein the relay connects the rectified power supply to the capacitor after a voltage across the capacitor reaches a predetermined level.

14. The device according to claim 7, wherein the motor is prevented from being forcibly rotated by the dynamic braking circuit.

15. The device according to claim 7, wherein the resistor and the relay which are used in an initial supply of power to prevent an inrush current are further used to prevent a stoppage of the motor due to an external force thereon.

16. The device according to claim 7, wherein the dynamic braking circuit uses diodes of the inverter to provide dynamic braking of the motor.

17. The device according to claim 7, wherein, when the dynamic braking circuit is connected to one end of the resistor, the dynamic braking circuit jointly use the resistor and one of the diodes of the inverter to prevent the inrush current by short-circuiting respective ones of the input terminals of the motor.